

## The Role of Artificial Intelligence Technology in Financial Audit Process: Challenges and Opportunities

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### ABSTRACT

This study systematically reviews the role of artificial intelligence (AI) in financial audit, identifying the opportunities and challenges posed by the transformation of the profession. Using a systematic literature review (SLR) approach based on the Petticrew and Roberts framework, the study covers empirical research between 2019 and 2024. The review results show that AI contributes to audit efficiency, accuracy, and productivity, primarily through automation of data analysis, anomaly detection, and predictive analytics for risk assessment. Critical factors for successful AI adoption include a robust technology infrastructure and a workforce with adequate analytical-technical skills. Key challenges include data privacy issues, ethics, and the shortage of AI experts in audit. The study also notes a shift in research focus from simply adopting AI to its impact on the role of auditors and audit quality. The findings offer guidance to accounting firms, educators, and regulators in developing policies and curricula that support the integration of AI in audit. The review provides insights for future professionals in navigating a technology-driven audit environment.

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## **INTRODUCTION**

Artificial Intelligence (AI) is a term that is intended to encourage AI enthusiasts. AI has become increasingly popular in recent decades because it forgets the creation of humans who can learn, think, and make decisions on their own with ordinary intelligence. Artificial Intelligence (AI) technology is now creating new innovations in the field of auditing by simplifying tasks such as reconciliation and accounting (Moffitt, 2020). This technology not only improves the quality of audit, but also saves time by providing accounting professionals with more tools and resources to simplify processes and provide better options for various business strategies (Kokina, Julia, 2023). Transformation and new technologies are very important, but they must be adapted to avoid major gaps. This often happens when using global intelligence in accounting, especially audit. Minimizing global intelligence requires collaboration and responsible technology development. Therefore, there will be no absolute superiority between human intelligence and digital intelligence, both will complement and interact with each other. The accounting industry thinks this way, but the high level of intelligence requirements of accounting intelligence has made the accounting industry slower to adopt technology than the digital industry (Luo, 2023).

Artificial Intelligence (AI) and big data are two hot topics being debated and discussed in many businesses today. However, the Nepal-based Roselbay Group says that not many businesses have been able to implement both mobile technologies. Speaking at a virtual discussion, Rohit Kulmar, Founder and CEO of Roselbay Group, said that combining data and artificial intelligence to create intelligent data can bring significant benefits to businesses. While data can be used to send ads to customers via SMS or email, the intelligence of the circle can help determine whether the ads are actually sent to the right customers. There is a huge potential for better data management in Indonesia because most businesses still manage their data manually. Currently, AI technology is commonly used by large e-commerce companies and banks, and Roselbay aims to bridge this gap by distributing big data and AI evenly. Big data and AI can be used in various industries, from communication services to health services, logistics, and the public sector. Roselbay transformed the data warehouse of the National Construction Services Company to achieve significant cost savings. On the other hand, financial institutions such as banks can gain significant benefits from digitalization by developing a more comprehensive process and marketing and sales strategies that lead to increased sales. Roselbay will develop facial recognition technology in three areas of big data and AI services in Indonesia: the legacy sector, facilitating customer identity verification, reducing barriers to implementation across big data and AI, and developing blockchain. Improving security through a combination of AI and AI. AI Powerers technology that predicts and prevents security violations. This study investigates the contribution of artificial intelligence (AI) to corporate audit processes and its benefits to legacy reporting (Aduloju, 2019).

The use of artificial intelligence in auditing offers great potential to improve efficiency, accuracy, and timeliness. AI systems can extract and analyze data at speeds far beyond human capabilities. This minimizes the risk of errors and provides deep insights to detect anomalies and potential for fraud. However, the use of artificial intelligence in auditing also has many challenges and limitations that need to be understood and overcome (Shaher Al-Aroud, 2020).

Trading and investment involve algorithmic trading, which uses complex AI systems to achieve trading results at a scale and speed that exceeds human capabilities. AI technology is used in military operations such as intelligence gathering, logistics, cyber operations, and command and control. In addition, AI technology is used in a wide range of applications in manufacturing, publishing, utilities, various service sectors, education, gaming, and almost all areas of society. Accounting and auditing will not be affected by the widespread use of AI technology. The advancement of AI technology has reached a tipping point, with new innovations and developments that have the potential to revolutionize the way professions and disciplines are practiced and perceived across the globe. Therefore, this study explores how AI technology has impacted the accounting and auditing profession to date and how the field may be impacted by AI technology in the future. Regardless of whether the professions are the same or not, what changes may occur in the profession/discipline and its literature, and regardless of how the practices change, countries around the world will be on the right track to bring its adoption to the world. An introduction to the accounting and auditing profession, policy implications, and ethical issues related to the adoption of AI are some of the issues discussed in this study.

## LITERATURE REVIEW

Big data combines four main characteristics: high volume, high velocity, high variability, and uncertainty (Albawwat, 2021). The term "big data" encompasses both the large amount of data and the data analysis techniques (algorithms) used to analyze the data. Recent advances in data storage and analysis capabilities have enabled companies to extract business value from their data and gain a deeper understanding of their business environment, customers, and competitors. In order to improve accounting, big data is invaluable as a source of data to generate business results (Moffitt, 2020).

Big data has been shown to improve decision-making accuracy and prediction (Mark A. Nickerson, 2019). For example, you can now examine unstructured data such as emails, phone calls, and documents from audit committee meetings (Baldwin, 2021). Its rapid literature has revealed the use of mass wisdom on social media platforms to investigate corporate reporting (Fred D. Davis, 2021). In addition, data visualization software can transform large amounts of data into information that can improve the decision-making process (Chukwuani, 2020). With the proliferation of big data, data privacy has become a real issue, and new regulations have been enacted in many countries. For example, on May 25, 2019, the European Union (EU) Global Data Protection Regulation (GDPR) came into effect, setting requirements for businesses to protect their customer data, including their use and sharing within their

businesses. In EU, the Payment Services Regulation 2 (PSD2) addresses customer protection issues, encourages innovation, and improves the privacy of payment services. The UK Competition and Markets Authority has recently launched a program called Open Banking that allows customers to securely share data with other banks and third parties via application program interfaces (APIs) (Fred D. Davis, 2021).

### ***Machine Learning***

In general, Machine Learning (ML) is a computational science that works without explicit programming (Solaimani, 2020). Applying various statistical techniques such as mathematical modeling, data visualization, and pattern recognition to carry out self-learning activities by inputting data to predict and understand trends and patterns in data (Puthukulam, 2021). Applications of ML models include analysis of corporate income forecasting and investment decision making. For example, Two Sigma Investments LP, an internationally-based holding company based in New York City, processed large amounts of data from more than 1,000 samples and used ML to build robust predictive investment models (Chukwudi, 2019).

Other applications of ML in the business world include predicting customer purchase intentions, which is widely used by Amazon and Taobao (Askary, 2019). In management accounting practices, ML helps classify transactions as part of management functions such as planning and analysis (FP&A). ML technology applications can be used to predict transaction classifications based on historical transaction analysis. However, the quality of the prediction depends on the quality and bias inherent in the data set used (Chassignol, 2023). An example of transaction classification is an email communication tool that classifies marketing and customer promotion as "advertising costs" and employee communications as "IT or communications costs". ML technology can be trained to classify and classify each category using algorithms that have been previously identified (Ayianna, 2021).

## **METHODOLOGY**

This study uses the Systematic Literature Review (SLR) method to review and analyze literature on the role of artificial intelligence (AI) in the financial audit process. This method follows the Petticrew and Roberts (2019) framework, which includes the stages of identifying research objectives, selecting articles, analyzing data, and drawing conclusions. First, the research question is identified to direct the search and selection of relevant literature, focusing on how AI is integrated into the financial audit process, the challenges and opportunities faced, and the factors that influence the success of AI integration in audits. Furthermore, inclusion and exclusion criteria are set to ensure that the selected literature is in accordance with the research topic. Inclusion criteria include articles published in accredited journals between 2019 and 2024, empirical studies discussing the application of AI in auditing or accounting, and articles in English or Indonesian. Meanwhile, articles that do not provide empirical data or only focus on the technical aspects of AI without any relation to auditing, as well

as studies that are not directly related to financial auditing or accounting, are excluded from this study.

Literature was collected from several academic databases such as Scopus, IEEE Xplore, and Google Scholar, using keywords such as “Artificial Intelligence,” “Financial Audit,” “Big Data,” “Systematic Literature Review,” and “Technological Integration.” The combination of keywords with Boolean operators helped narrow down the search results to be more relevant. The literature selection process was conducted in two stages: title and abstract selection to filter articles that met the inclusion criteria, followed by full-text review to ensure the relevance of the articles to the research objectives. Data from the selected articles were extracted by recording the methods used, main results, conclusions, and challenges and opportunities of AI in audit, then arranged in tables for easy analysis. The data were analyzed thematically to identify patterns, trends, and gaps in related research. The results of this study are presented in narrative and tabular form, covering a general description of the studies analyzed, key themes identified, and conclusions regarding the impact of AI in financial audit, challenges faced, and opportunities emerged. This SLR method allows for a comprehensive and systematic review, providing an in-depth view of the development, challenges, and opportunities of AI in financial audit, and providing a strong foundation for further research and implementation of AI in this field.

## RESEARCH RESULT

This study identified 10 articles that met the inclusion and relevance criteria regarding the use of big data and machine learning in business and accounting decision making:

Table 1. Previous Research

No	Author and Year	Topic	Key Concept	Result
1.	Albawwat (2021)	Big Data	Big Data has four main characteristics: high volume, high velocity, high variability, and uncertainty.	Big data provides business value by providing data for deep understanding of the business environment, consumers, and competitors.
2.	Moffitt (2020)	Big Data in Accounting	Big data as a source of financial data that supports business decision making.	Big data has been shown to improve the accuracy of business decisions, enabling analysis of unstructured data, such as emails and

				meetings, for better auditing.
3.	Mark A. Nickerson (2019)	Big Data and Decision Making	Big data improves prediction and decision-making accuracy.	Big data visualization enables better decision-making, and mass data on social media can detect corporate manipulation.
4.	Baldwin (2021)	Big Data Analysis in Social Media	The use of big data for social media data analysis as a tool for detecting manipulation.	The use of big data for collective understanding on social media helps companies detect manipulative practices.
5.	Frel D. Davis (2021)	Data Security in Big Data	The importance of data security and data protection policies such as GDPR and PSD2 in Europe.	Data protection is becoming more important as big data grows; regulations such as GDPR and Open Banking help protect user data and drive innovation.
6.	Solaimani (2020)	Machine Learning	ML as a computer science that can work without explicit programming, using statistical models, mathematical modeling, and pattern recognition.	ML can be used to predict and understand trends and patterns in data used in business and investment.
7.	Pulthukkullam (2021)	Application of Machine Learning for Prediction and Data Analysis	Machine Learning for analyzing trends and patterns, including income and investment decisions.	Machine learning is used by investment firms like Two Sigma to process big data from thousands of sources and create investment prediction models.
8.	Askary (2019)	Machine Learning in	Predicting consumer purchase intention using machine learning.	Amazon and Taobao use ML to predict consumer

		Consumer Prediction		interest in purchasing products.
9.	Chassignol (2023)	Machine Learning in Management Accounting	The use of ML to classify transactions in management functions such as FP&A (Financial Planning & Analysis).	ML technology can predict transaction classifications based on historical analysis, such as classifying marketing communications as "advertising expenses" and employee communications as "IT or communications expenses."
10.	Ayianna (2021)	Machine Learning Application for Transaction Classification	Machine learning technology to detect and differentiate cost categories with predetermined algorithms.	Machine learning helps classify transactions where previous algorithms help separate transactions into different categories, supporting a more accurate and effective management accounting process.

*Source: Scopus, IEEE Xplore, and Google Scholar (2024)*

This table covers various applications of big data and machine learning in the context of decision-making, data security, and management accounting, showing their impact in improving efficiency and accuracy in various aspects of business.

## DISCUSSION

### Accountants' Views on Artificial Intelligence (AI) in Accounting

Artificial intelligence (AI) is a method of automating processes using rules that have been reflected in humans. This creates technology that can speed up and simplify accounting work (Kamil Omoteso, 2022). The results of this study also complete several things that underlie the emergence of artificial intelligence (AI) (Nwakaego, 2019):

1. Fast technology is very much needed in accounting  
The development of the era has produced technology that is faster, more efficient, and more efficient in accounting. With the presence of the digital industrial revolution 4.0, the need for food has changed (Balios, 2020). Food that used to be a basic need for society, but now with the proliferation of intelligence, things have changed.
2. Automation technology  
Artificial intelligence (AI) can act like humans, especially when doing frequent or repetitive tasks. Doing it manually takes a long time (Joel Demski, 2020). Automation technology can be very helpful in completing work quickly. Advances in artificial intelligence (AI) technology eliminate manual errors and increase the speed of redundant tasks.
3. Need Data  
Real-time management allows for real-time reporting of redundancies so that you can easily evaluate the company's operations. Management can monitor the development of the company on a daily basis. This also facilitates the implementation of plans based on daily evaluation of redundancies reports (Chassignol, 2023).

### ***The Role of Accountants in Facing Artificial Intelligence (AI) in Accounting***

Technology has taken over the work of professional accountants such as collecting accounting data, taxes, audit processes and providing data for decision-making. The Association of Certified Public Accountants (ACCA) report explains that the birth of artificial intelligence (AI) will help the accounting profession and change the role of accounting into a more specialized profession. The results of the study showed the same thing. All informants stated that there would be a change in the role of accounting professionals (Schulenberg, 2019). In the past, accountants were tasked with preparing tax returns and did not need to do much else. Accountants are required to be more skilled in analyzing tax returns. The role of accountants in the future is (Raji, 2019).

1. Tax Consultant  
This raises a problem where taxpayers do not follow tax regulations because they do not understand the applicable regulations. In addition, corporate accountants may not understand the complicated tax regulations. Therefore, this can be a challenge for tax advisors (Rizvan Ahmad Hasan, 2022). Tax accountants are highly sought after by both individuals and businesses. The advantage of tax accounting over RPA is that it allows tax advisors to be more flexible in responding to changes in taxation.
2. Financial Analyst  
This is your chance to become a professional accountant as a financial analyst. Intelligence Round (AI) can only produce financial reports and cannot provide recommendations to management. This is a weakness of Intelligence Round (AI), but can be transformed into a financial advisor by an accountant (Lin, 2019). Accountants act as analysts and, based on

the results of the analysis, make recommendations that contribute to the further development of the company.

3. Financial Planner

Financial Planners help businesses and investors implement business plans based on the results of business reports produced by AI. Business reports are used as a basis and further actions are taken by a business planner (Kaplan, Andreias, 2019). The results are recommendations for financing, investment, insurance, and tax planning.

4. Public Accountant

Ministry of Industry and Trade Decree Number 121/MPP/Kelp/2/2022 explains that audit reports must be audited. Therefore, despite technological advances, accounting graduates have a greater chance of becoming auditors

### *Accountant Strategies in Facing the Emergence of Artificial Intelligence (AI)*

Strategies for accountants to overcome the emergence of artificial intelligence (AI). The potential of artificial intelligence (AI) poses great challenges for accountants. The skills of an accountant can be equated with artificial intelligence (AI). The results of interviews with seven informants complete the challenges faced by accountants (Mohamed Salem, 2022).

- a. Accountants must have a good attitude and a strong will to face the changes that occur.
- b. Accountants also need to understand technology, because they are willing to work side by side with technology using artificial intelligence (AI)
- c. Special accounting skills such as tax, accounting, calculation, etc. must be discussed.

Robots cannot replace accountants if the robot itself has many special skills such as: business consulting, long-term analysis, handling special cases in accounting processes (Kokina, Julia, 2023). The skills required to become a professional accountant are professional certification, communication skills, and compliance with the code of ethics. The results of the study also showed the same thing, namely several skills that must be obtained by someone to survive (Ali Qadir Hemin, 2020).

a. Tax

Taxation knowledge includes taxation regulations, taxation law, applicable tax types, tax targets, tax rates, calculating and recording tax obligations, recording tax obligations, and submitting tax returns according to the deadline.

b. Tax Report Analysis

This skill is highly required by tax analysts and tax planners. Both careers require good analytical skills, but the results are different. Tax advisors provide tax advice, build investment portfolios, and help clients feel confident in their tax decisions. Tax analysts, on the other hand, review tax reports, market trends, tax returns, and investments (Lelel, Chelah Saw, 2020).

c. Tax Professional Certification

Some professions require a professional certification, which serves as a license to practice their profession. Tax accountants must have a Tax Accountant License (SKP). Tax analysts must obtain a CFA. Tax planners must obtain a CFP certification. Auditors must have a certified public accountant (Gelntnelr, 2019).

d. Communication

This feature is used to provide recommendations to administrators regarding the results of the work carried out.

## CONCLUSIONS AND RECOMMENDATIONS

The close integration of new technologies such as big data, ML, and AI in accounting has brought about significant changes in the accounting profession, including: Redesigning accounting procedures, reducing errors and distortions in accounting information, increasing accounting efficiency, and encouraging changes in accounting career structures. This article introduces a comprehensive and deep integration of AI and accounting technology. As accounting firms increasingly embrace these new technologies and challenges, accounting professionals (practitioners, faculty, and students) are expected to gain knowledge about these technologies to create more efficient accounting practices.

## ADVANCED RESEARCH

Accounting skills must be significantly transformed. You must learn data science, statistical modeling, and technology and apply them to risk contexts. The adoption of AI must inspire the same enthusiasm for innovation. Risk managers and internal auditors play a critical role in helping companies maintain control through the adoption of new technologies. The CPA should strongly support liberal education while encouraging and providing opportunities for students to explore these new technologies.

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